

## **POLICY ISSUE**

### **Notation Vote**

October 29, 2015

SECY-15-0137

FOR: The Commissioners

FROM: Victor M. McCree  
Executive Director for Operations

SUBJECT: PROPOSED PLANS FOR RESOLVING OPEN FUKUSHIMA  
TIER 2 AND 3 RECOMMENDATIONS

#### **PURPOSE:**

The purpose of this paper is to obtain Commission approval of the U.S. Nuclear Regulatory Commission (NRC) staff's proposed plans to resolve and close the remaining open Tier 2 and 3 recommendations developed in response to the March 11, 2011, accident at the Fukushima Dai-ichi nuclear power plant.

#### **SUMMARY:**

This SECY paper provides the staff's proposed plans for resolving the open Fukushima Tier 2 and 3 recommendations. The NRC's Near-Term Task Force (NTTF), the staff, and other stakeholders developed these recommendations based on lessons learned from the accident. The staff has completed its evaluation and developed proposed resolution plans for each recommendation. These resolution plans are documented in the enclosures to this paper. The staff's evaluation considered existing requirements and voluntary measures to confirm their adequacy and to determine if the other recommendations would provide a substantial safety improvement if implemented. Based on its evaluation, the staff has sorted the resolution plans for the Tier 2 and 3 recommendations into three groups: (1) recommendations that should be closed now; (2) recommendations that the staff's initial assessment has concluded should be

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closed, but for which stakeholder interaction is warranted prior to finalizing the staff's assessment; and (3) recommendations for which the staff has not yet completed its assessment, stakeholder interactions, and/or documentation. The staff recommends that the Commission approve these plans, including closure of some recommendations.

#### BACKGROUND:

The NRC's NTTF was established shortly after the Fukushima Dai-ichi accident and was directed to conduct a methodical and systematic review of NRC processes and regulations, and provide recommendations to the Commission on whether the agency should make changes to its regulatory program in response to the accident. In SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11186A950), the NTTF provided its recommendations to the Commission. The staff requirements memorandum for SECY-11-0093 (ADAMS Accession No. ML112310021), dated August 19, 2011, directed the staff to recommend a prioritization of the NTTF's recommendations.

In SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 5, 2011 (ADAMS Accession No. ML11272A111), the staff provided the Commission with its proposed prioritization of the NTTF recommendations. In SECY-11-0137 and during subsequent interactions with stakeholders, the staff identified a number of additional issues with a clear connection to the Fukushima Dai-ichi accident that may warrant regulatory action, but that were not included in the NTTF's recommendations. These additional recommendations were prioritized either in SECY-11-0137 or as part of later evaluations.

The staff's prioritization approach grouped the recommendations in three tiers. Tier 1 consisted of those NTTF recommendations that the staff determined would have the greatest potential safety improvement in the near term, which should be started without delay, and for which sufficient resources and critical skill sets were available. Tier 2 consisted of those NTTF recommendations that could not be initiated in the near-term due to factors such as the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill sets. Tier 3 consisted of those NTTF recommendations that required further staff study to support a regulatory action, had an associated shorter-term action that needed to be completed to inform the longer-term action, were dependent on the availability of critical skill sets, or were dependent on the resolution of NTTF Recommendation 1. Most of the Tier 3 items involved studies and evaluations.

The NRC staff documented initial project plans for Tier 2 recommendations in SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," dated February 17, 2012 (ADAMS Accession No. ML12039A103). Initial project plans for the Tier 3 recommendations were documented in SECY-12-0095, "Tier 3 Program Plans and 6-Month Status Update in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," dated July 13, 2012 (ADAMS Accession No. ML12208A210). While the staff's focus to date has been on implementing the Tier 1 recommendations, the staff has been working on many of the other recommendations, consistent with the initial project plans. In addition, many of the initial Tier 2 and 3 recommendations have been subsumed into Tier 1 activities (most

notably the Mitigation of Beyond-Design-Basis Events rulemaking and the related order), and the evaluation of the need to expedite the transfer of spent fuel to dry cask storage, a staff-identified Tier 3 recommendation, was completed in May 2014.

The open Tier 2 and 3 recommendations, which have not been subsumed into Tier 1 activities or otherwise resolved, include the following (where applicable, the corresponding NTTF recommendation is provided):

1. Evaluation of Other Natural Hazards (Tier 2)
2. Periodic Reconfirmation of Natural Hazards (Tier 3, R 2.2)
3. Evaluation of Capabilities to Prevent Seismically-Induced Fires and Floods (Tier 3, R 3)
4. Consideration of Reliable Vents for Other than Mark I and II Containments (Tier 3, R 5.2)
5. Evaluation of Hydrogen Control and Mitigation (Tier 3, R 6)
6. Reactor and Containment Instrumentation Enhancements for Beyond-Design-Basis Events (Tier 3)
7. Evaluation of Emergency Planning Zone Size and Pre-Staging of Potassium Iodide Beyond 10 Miles (Tier 3)
8. Various Emergency Preparedness Activities (Tier 3, R 9-11)
9. Enhancements to the Reactor Oversight Process (Tier 3, R 12.1)
10. NRC Staff Training on Severe Accidents and Severe Accident Management Guidelines (Tier 3, R 12.2)

The enclosures to this paper provide additional information on each of these recommendations, including a summary of the activities completed to date (note that items 4 and 5 above are combined in Enclosure 4). Information on the staff's progress in implementing the Tier 1 recommendations can be found in the staff's most recent periodic update to the Commission, SECY-15-0128, "Eighth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami" (ADAMS Accession No. ML15245A473).

## DISCUSSION:

Resolution of the open Tier 2 and 3 recommendations is important to ensure timely consideration of Fukushima lessons learned. As such, the staff began reassessing its initial plans for addressing these recommendations in early 2015. The majority of the open items consist of recommendations to evaluate the need for further regulatory action, rather than a recommendation to take a specific regulatory action (such as issuing an order to require a specific safety enhancement). As such, for each recommendation, the staff's reassessment began with an evaluation of the issue in light of existing requirements and voluntary measures to confirm their adequacy and to determine if any recommendation would provide for a substantial safety improvement. In conducting these evaluations, the staff considered previous Commission decisions on related matters, information obtained from its work on the Tier 1 recommendations, and the safety enhancement that will be achieved with full implementation of the NRC's Tier 1 initiatives.

With respect to Tier 1 activities, the safety enhancements being put in place as a result of NRC orders will improve the protection and mitigation capabilities of U.S. nuclear power plants. These orders are the following: EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated

March 12, 2012 (ADAMS Accession No. ML12054A735), which requires the development of strategies to mitigate beyond-design-basis events through maintenance of key safety functions; EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (ADAMS Accession No. ML12056A044), which requires installation of reliable spent fuel pool instrumentation; and EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013 (ADAMS Accession No. ML13130A067), which requires reliable, severe-accident-capable hardened containment venting systems for boiling-water reactors with Mark I and II containments. Additional activities, such as seismic and flooding walkdowns and ongoing hazard reevaluations, provide further assurance that nuclear plants can cope with seismic and flooding events of concern. Enhancements to licensees' emergency response capabilities (e.g., in the areas of staffing and communication) are also being put in place. Finally, ongoing rulemaking activities will ensure that actions taken in response to the accident are made generically applicable through incorporation into the regulations, including lessons learned from the implementation of the related orders. Many of these actions address, in whole or in part, a number of the Tier 2 and 3 recommendations.

The staff's approach to reassessing the plans for the open Tier 2 and 3 recommendations primarily involved technical evaluations to assess the need for additional regulatory action, considering the existing protection provided under NRC requirements and new information obtained during completion of Tier 1 activities. This approach is similar to the approaches used by the staff in SECY-15-0081, "Staff Evaluation of Applicability of Lessons Learned from the Fukushima Dai-ichi Accident to Facilities Other Than Operating Power Reactors," dated June 9, 2015 (ADAMS Accession No. ML15050A066), to evaluate lessons learned for facilities other than operating power reactors and in Enclosure 6 to SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," dated April 9, 2015 (ADAMS Accession No. ML15069A600), to develop the assessment of Fukushima-related recommendations provided by the National Academies of Science in their report on the accident. In some cases, the staff used insights gained from completed analyses, such as the Expedited Transfer of Spent Fuel regulatory analyses and Containment Protection and Release Reduction rulemaking draft regulatory basis, to inform the reviews. The staff prepared the evaluations and the associated resolution plans with the goal of resolving all the remaining Tier 2 and 3 recommendations as efficiently as possible, while maintaining appropriate levels of technical rigor and opportunities for stakeholder involvement.

The staff recognizes that any new regulatory requirement imposed as a result of the open Tier 2 and 3 recommendations must be appropriately justified, as required by Title 10 of the *Code of Federal Regulations*, Section 50.109, "Backfitting," and other similar regulations. As discussed in the enclosures to this paper and as summarized below, for the majority of the open Tier 2 and 3 recommendations, the staff's evaluation has determined that the NRC's existing regulatory framework and requirements are adequate and that no further regulatory action or analysis is needed. The staff has identified some areas where the staff believes that additional enhancement or evaluation is warranted. In addition, while the Advisory Committee on Reactor Safeguards (ACRS) was provided with an overview of its plans, the staff has not yet fully interacted with ACRS and other stakeholders on the results of its assessments. As such, the staff's proposed resolution plans for the remaining Tier 2 and 3 recommendations are organized into three groups:

1. Recommendations that should be closed now. No further assessment or stakeholder interaction is necessary.
2. Recommendations that the staff's initial assessment has concluded should be closed, but for which interaction with ACRS or external stakeholders is warranted prior to finalizing the assessment.
3. Recommendations for which the staff has not yet completed its assessment and/or documentation, along with ACRS or external stakeholder interaction.

As described in the enclosed plans, for those recommendations in the second two groups, the staff proposes to interact with stakeholders, complete the assessments, and inform the Commission of the final results of its evaluation as soon as practicable and by no later than the end of March 2016 (Group 2) or calendar year 2016 (Group 3).

The table below summarizes the staff's proposed resolution plan for each of the open Tier 2 and 3 recommendations. As discussed above, these plans are described further in the enclosures to this paper.

<b>SECY Encl.</b>	<b>Tier</b>	<b>Source of Action</b>	<b>Description</b>	<b>Staff's Recommendation</b>
1	2	ACRS and Consolidated Appropriations Act, 2012	Evaluation of Other Natural Hazards	Group 3 – complete by December 2016
2	3	NTTF Rec. 2.2	Periodic Confirmation of Natural Hazards	Group 3 – complete by December 2016
3	3	NTTF Rec. 3	Capabilities to Prevent Seismically-Induced Fires and Floods	Group 1 – close now
4	3	NTTF Recs. 5.2 and 6	Reliable Vents for Other Containments and Hydrogen Control and Mitigation	Group 2 – complete by March 2016
5	3	ACRS	Reactor and Containment Enhanced Instrumentation for Beyond-Design-Basis Events	Group 2 – complete by March 2016
6	3	NRC Staff	Evaluation of Emergency Planning Zone Size and Pre-Staging of Potassium Iodide Beyond 10 Miles	Group 1 – close now
7	3	NTTF Recs. 9, 10, and 11	Various Emergency Preparedness Activities	Group 1 – close now/ Group 3 – complete by December 2016
8	3	NTTF Rec. 12.1	Enhancements to the Reactor Oversight Process	Group 1 – close now
9	3	NTTF Rec. 12.2	Enhancements to NRC Staff Training on Severe Accidents and Severe Accident Management Guidelines	Group 1 – close now

Notwithstanding final resolution of these recommendations, the staff notes that work will continue in some of these areas for many years. For example, the NRC staff will continue to engage with the international community on long-term health studies in the areas around Fukushima Dai-ichi and will continue work to ensure post-Fukushima safety enhancements are appropriately incorporated into the NRC's existing oversight programs. The NRC research activities related to improving the understanding and modeling of reactor behavior during severe accidents will likewise continue. The staff intends to use established programs and processes to conduct these activities, including engagement with the Commission, if appropriate.

#### Plan for Stakeholder Interactions

As discussed above, based on assessments completed to date, the staff has concluded that a sufficient basis does not exist for regulatory action on the majority of the open Tier 2 and 3 recommendations. The staff held a Category 2 public meeting with the industry's Fukushima steering committee on October 20, 2015, which included an extended public comment period, to discuss the staff's proposed resolution plans for the open Tier 2 and 3 recommendations. However, the staff has not yet had the opportunity to fully solicit input from external stakeholders, including members of the public and industry representatives, on their views of the staff's assessments. After issuance of this paper, the NRC staff plans to conduct public meetings on those proposed plans it anticipates could benefit from external stakeholder input (i.e., the Group 2 and 3 recommendations) and incorporate feedback, as appropriate.

The staff has interacted with the ACRS to provide an overview of the initial assessments and resolution plans. A meeting with the ACRS's Fukushima subcommittee was held on October 6, 2015, and an ACRS full committee meeting is scheduled for November 5, 2015. As discussed in the enclosures, subsequent to issuance of this paper, the NRC staff intends to conduct focused briefings for ACRS on the Group 2 and 3 recommendations after any related public meetings have been held, if needed to support ACRS's review of the staff's assessments. The staff will incorporate ACRS feedback in developing a final assessment of each of those recommendations.

The staff will inform the Commission of the final results of its evaluation of each Group 2 and 3 recommendation following its interaction with external stakeholders and ACRS. The staff will also recommend to the Commission an appropriate regulatory action or closure of the recommendation.

#### RESOURCE:

Resource considerations for each specific recommendation are summarized in the table below and discussed in the enclosures. The staff estimates that approximately \$130K and 5.4 full-time equivalent staff (FTE) will be needed in fiscal year (FY) 2016 to resolve and close the remaining Tier 2 and 3 recommendations. The staff notes that while sufficient resources for this work are included in the FY 2016 budget under the Operating Reactors Business Line and Fukushima NTTF Product, some minor resource reallocation between the Tier 2 and 3 recommendations may be needed. The staff also notes that additional adjustments may be needed following stakeholder interactions; any shortfalls will be funded by reallocating resources from within the Operating Reactors Business Line. It is expected that the accelerated approach discussed in the enclosures will eliminate the need for additional resources in subsequent years, unless the

staff identifies the need to take a future regulatory action (e.g., initiate a rulemaking activity) as it finalizes the evaluations.

For FY 2017, the staff notes that, pending Commission approval of the closure plans, there are only two areas where resources needs are currently envisioned. As discussed in Enclosures 2 and 5, the staff anticipates the need for additional resources to support its work on the assessment of updated natural hazard information and on enhanced instrumentation. Should the Commission approve the closure plan, the resource estimates for the staff's work related to natural hazards for FY 2017 and beyond will be provided in a future SECY paper describing the details of the staff's process for addressing this item. FY 2017 resources for enhanced instrumentation are associated with finalization of a voluntary industry standard, not directly related to closure of this recommendation. The resource needs for this activity are expected to be minimal (i.e., at the 0.1 FTE level).

Tier 2 and 3 Recommendations	Product Line	Office	FY 2016 Resources	
			\$K	FTE
Evaluation of Other Natural Hazards	Licensing	NRR	0	0.6
	Licensing	NRO	0	0.8
	Licensing	OGC	0	0.1
	Research	RES	0	0.25
	<b>Total</b>		0	1.75
Updating of Natural Hazard Information to Address NTTF Recommendation 2.2	Licensing	NRR	0	0.35
	Licensing	NRO	0	0.35
	Licensing	OGC	0	0.05
	Research	RES	0	0.5
	<b>Total*</b>		0	1.25
Evaluation of Capabilities to Prevent Seismically-Induced Fires and Floods	Licensing	NRR	0	0.1
	Research	RES	\$30	0.1
	<b>Total</b>		\$30	0.2
Consideration of Reliable Vents for Other than Mark I and II Containments and Evaluation of Hydrogen Control and Mitigation	Licensing	NRR	0	0.2
	Licensing	OGC	0	0.1
	Research	RES	0	0.2
	<b>Total</b>		0	0.5
Reactor and Containment Instrumentation Enhancements for Beyond-Design-Basis Events	Licensing	NRR	0	0.1
	Licensing	NRO	0	0.1
	Research	RES	0	0.8
	<b>Total</b>		0	1.0
Evaluation of Emergency Planning Zone Size and Pre-Staging of Potassium Iodine Beyond 10 Miles	Licensing	NSIR	0	0.25
Various Emergency Preparedness Activities	Licensing	NSIR	0	0.45
Enhancements to the Reactor Oversight Process	Oversight	NRR	0	0
NRC Staff Training on Severe Accidents and Severe Accident Management Guidelines	Training	OCHO	\$100	0
<b>Grand Total</b>			<b>\$130</b>	<b>5.4</b>

RECOMMENDATION:

The staff's proposed closure plans for the open Tier 2 and 3 recommendations are summarized above, with further detail provided in the enclosures. The staff recommends that the Commission approve these plans, including the closure of some recommendations.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

*/RA/*

Victor M. McCree  
Executive Director  
for Operations

Enclosures:  
List of Enclosures



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**/RA/**

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Executive Director  
for Operations

Enclosures:  
List of Enclosures

**SRM-S15-0065-5**

**ADAMS Accession Nos.: Package ML15254A006; SECY ML15254A008; Enclosure 1 ML15254A009;  
Enclosure 2 ML15254A010; Enclosure 3 ML15254A013; Enclosure 4 ML15254A016;  
Enclosure 5 ML15254A034; Enclosure 6 ML15254A036; Enclosure 7 ML15254A039;  
Enclosure 8 ML15254A040; Enclosure 9 ML15254A041**

**\*via email**

<b>OFFICE</b>	NRR/JLD/LA	QTE*	NRR/JLD/JPSB/PM	NRR/JLD/JBSB/BC	RES/DRA/D*
<b>NAME</b>	SLent	JDougherty	MValentin (JSebrosky)	GBowman	RCorreia
<b>DATE</b>	8/25/15	9/30/15	9/4/15	9/14/15	9/23/15
<b>OFFICE</b>	RES/DSA/D*	RES/DE/D*	NRO/DSEA/D*	NRO/DSRA/D*	NSIR/DPR/D*
<b>NAME</b>	MCase	BThomas	SFlanders	JMonninger	RLewis
<b>DATE</b>	9/25/15	9/23/15	10/2/15	9/29/15	9/17/15
<b>OFFICE</b>	NRR/DRA/D*	NRR/DIRS/D*	NRR/DSS/D*	NRR/DE/D*	NRR/DPR/D*
<b>NAME</b>	SLee	SMorris	RTaylor	JLubinski	LKokajko
<b>DATE</b>	9/25/15	9/25/15	9/24/15	9/17/15	9/17/15
<b>OFFICE</b>	NRR/JLD/D	NRO/D*	NMSS/D*	NSIR/D*	RES/D*
<b>NAME</b>	JDavis	GTracy (SFlanders for)	SMoore	BHolian	SWest
<b>DATE</b>	9/25/15	10/16/15	10/16/15	10/16/15	10/15/15
<b>OFFICE</b>	Region I/RA*	Region II/RA*	OGC (NLO)*	CFO*	NRR/D
<b>NAME</b>	DLew	LWert	SClark	PHabighorst	WDean
<b>DATE</b>	10/16/15	10/9/15	10/19/15	10/1/15	10/26/15
<b>OFFICE</b>	EDO				
<b>NAME</b>	VMcCree				
<b>DATE</b>	10/29/15				

**OFFICIAL AGENCY RECORD**

## List of Enclosures

Enclosure 1: Proposed Resolution Plan for Tier 2 Additional Recommendation – Evaluation of Other External Natural Hazards

Enclosure 2: Proposed Resolution Plan for Tier 3 Recommendation 2.2 – Periodic Reconfirmation of Natural Hazards

Enclosure 3: Proposed Resolution Plan for Tier 3 Recommendation 3 – Potential Enhancements to the Capability to Prevent or Mitigate Seismically-Induced Fires and Floods

Enclosure 4: Proposed Resolution Plan for Tier 3 Recommendations 5.2 – Reliable Hardened Vents Other Containments and 6.0 for Hydrogen Control and Mitigation Inside Containment and Other Buildings

Enclosure 5: Proposed Resolution Plan for Tier 3 Additional Recommendation – Enhanced Reactor and Containment Instrumentation for Beyond-Design-Basis Conditions

Enclosure 6: Proposed Resolution Plan for Tier 3 Additional Recommendation – Basis of Emergency Planning Zone Size and Pre-Staging of Potassium Iodine Beyond 10 Miles

Enclosure 7: Proposed Resolution Plan for Tier 3 Recommendations 9, 10, and 11 – Emergency Preparedness Activities Not Addressed Elsewhere

Enclosure 8: Proposed Resolution Plan for Tier 3 Recommendation 12.1 – Enhancements to the Reactor Oversight Process

Enclosure 9: Proposed Resolution Plan for Tier 3 Recommendation 12.2 – Enhancements to Severe Accident Training for NRC Staff and Severe Accident Management Guidelines for Resident Inspectors